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ABSTRACT

Television plays an important part in the process of teaching and learning in a number of countries in the Asian Region. Although television can be used in any normal classroom, there are a few aspects of television viewing that, if considered at the design stage, will result in greater convenience. This digest sets out the main points that should be observed in the design of schools in which television will be used. Items discussed and illustrated include the geometry of viewing, considering classroom shapes, sizes, and window locations; illumination level; and acoustics. Also included is an outline of the space requirements for the installation of broadcasting studios in schools. (Author/MLF)

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SCHOOL BUILDING DIGEST 14.

Asian Regional Institute for School Building Research
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U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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TELEVISION AND SCHOOL BUILDING DESIGN IN THE ASIAN REGION

Introduction

Television already plays an important part in the process of teaching and learning in a number of countries in the Asian Region. The role of the medium will increase in importance quite sharply during the next few years. In India, for example are 525 sets in 347 schools, with 140,000 student viewers in Delhi alone, and it is planned during the next two or three years to give coverage to 53.65 million students from seven new broadcasting stations using a satellite.

This Digest thus neither needs nor seeks to speculate on the increasing use of television in the countries of the Region, but rather to set out in simple form, the few main points that should be observed in the design of schools in which, at however remote a period, it is thought that television will be used.

In this context, it should be stated that the installation of television facilities in a school need result in no dramatic design changes. Television can be used, as indeed it frequently is already, in any normal classroom. There are a few aspects of television viewing, however, which, if consideration is given at the design stage, will result in somewhat greater convenience than is often presently the case.

Geometry of viewing

The maximum horizontal angle for viewing is 45° on one side of the centre line of the set. The maximum vertical angle is 30° above seated eye level. Figure 1 illustrates this point.

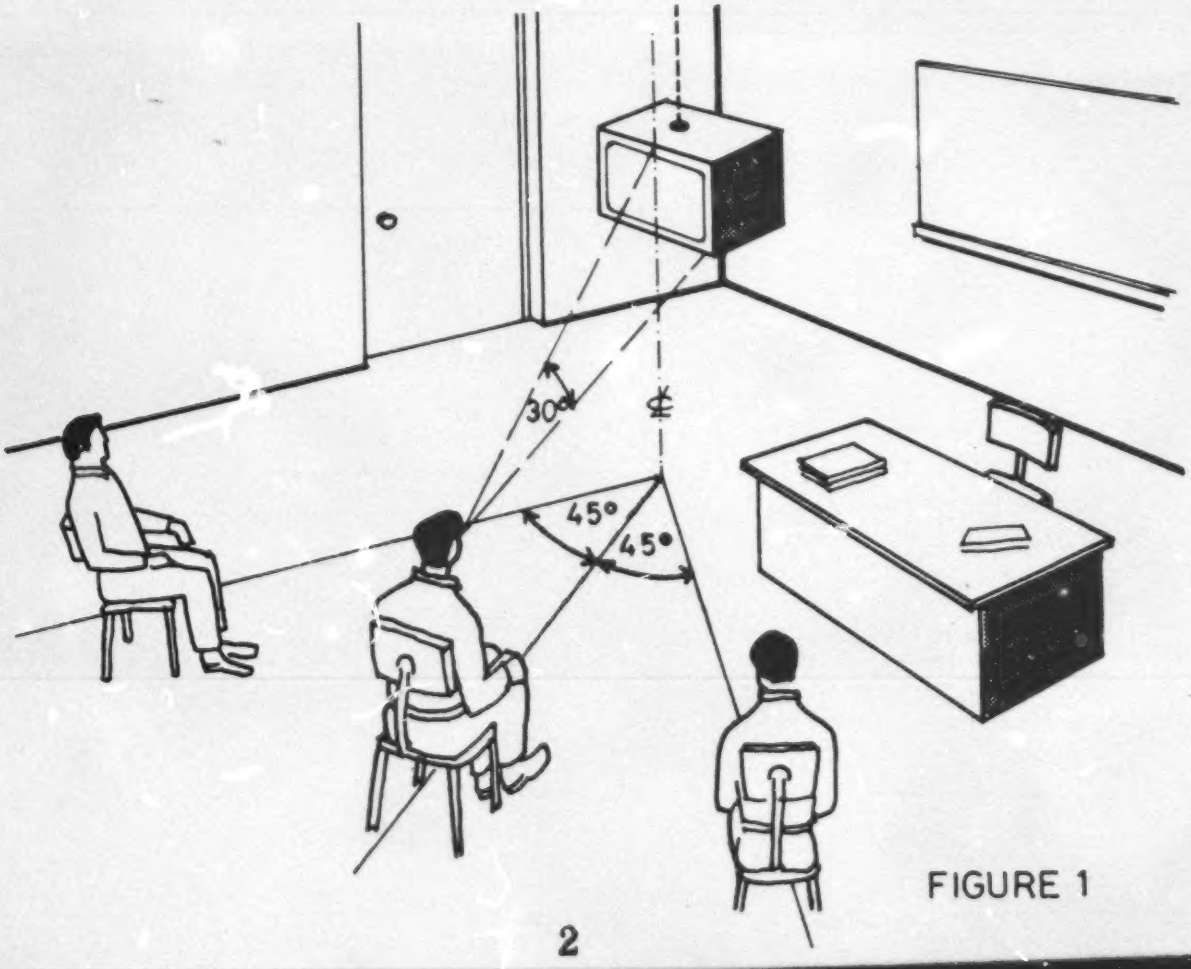

FIGURE 1

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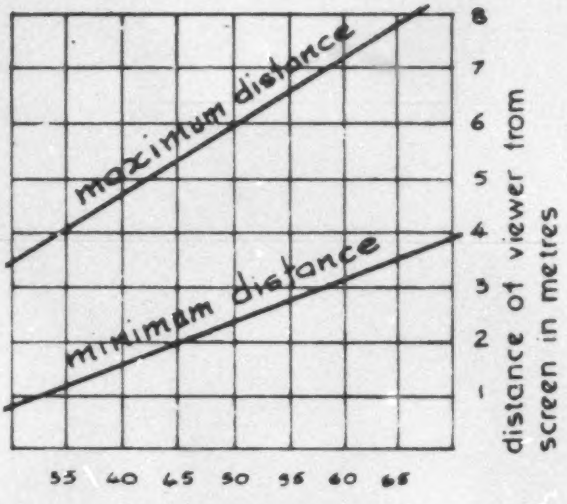
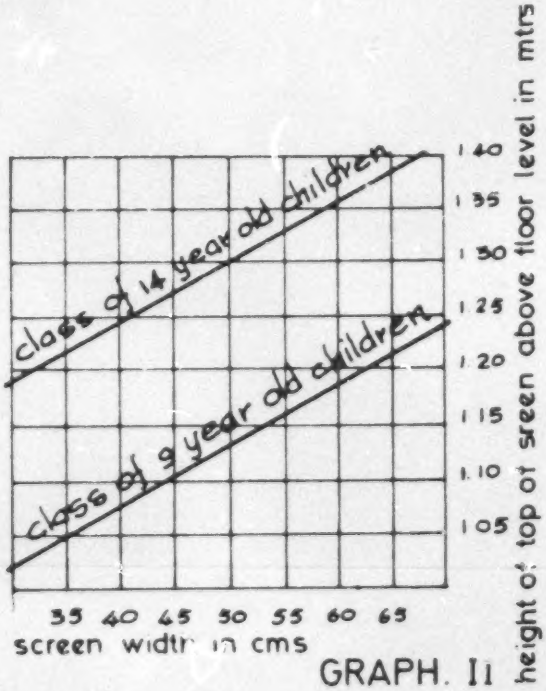


GRAPH. 1

The minimum distance from the screen for comfortable viewing is 4 x the screen width (s) and the maximum is 12s (Figure 2).

Graph I gives the maximum and minimum distances from the screen for various screen widths.

For seated primary school children aged 9 years and secondary school children aged 14 years, with a minimum distance from the screen of 4 s, the height of the top of the screen above floor level should be as shown in Graph II.



GRAPH. II

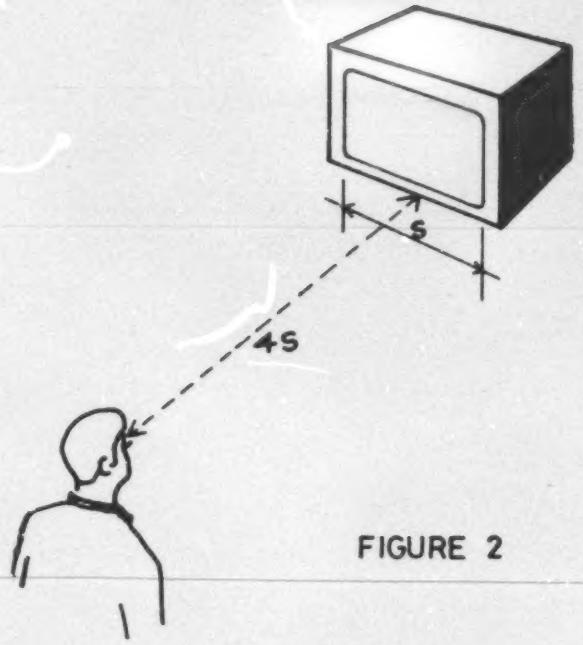
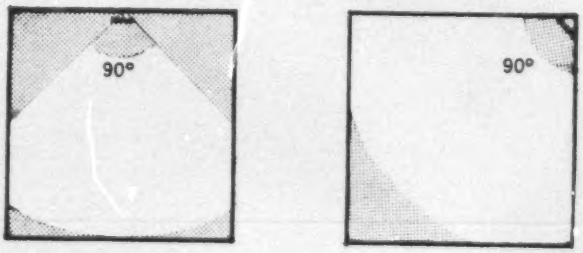


FIGURE 2

A problem that is frequently discussed in books is how, with such a low position for the screen, it is possible for the students at the rear of the class to see over the heads of those in front. Students in practice, of course, adjust their positions horizontally to avoid the heads in front of them – they are used to doing this every day at school in order to see the chalkboard. The substitution of a television set for a chalkboard presents them with a similar problem which they solve in a similar way. The slight adjustments in position that may result can be better achieved if children are provided with individual rather than double desks.

Classroom shapes and sizes

To take advantage of the 90° viewing angle (45° on either side of the centre line of the screen) the television set can, as Figure 3 shows, best be put in the corner of a rectangular teaching space.



more viewing space wasted if television screen central

FIGURE 3

Two common sizes of classrooms (maximum and minimum width) are given in Figure 4 below. The usable area of each room for television viewing depends on the width of screen as is shown by the Figure.

The Television screen and windows.

If the television screen is located in a corner of the room it is possible that it will be seen against a background of very bright light from the window and this will cause discomfort through glare. The situation is illustrated in Figure 5.

There are two solutions to this problem. First, in areas where the external illumination is of the order of 8000 lux, that is in Iran, W. Pakistan, N. India and Singapore, curtains will be needed to darken the room sufficiently for the screen to be clearly seen. In such cases the screen can be located as in Figure 5, against a window which can be obscured. In the remaining areas, where the sky luminence is normally lower, such as the Philippines, Japan, Indonesia and Ceylon, it is not absolutely necessary to darken the windows – a hood around the screen is adequate. The window brightness problem can be overcome.

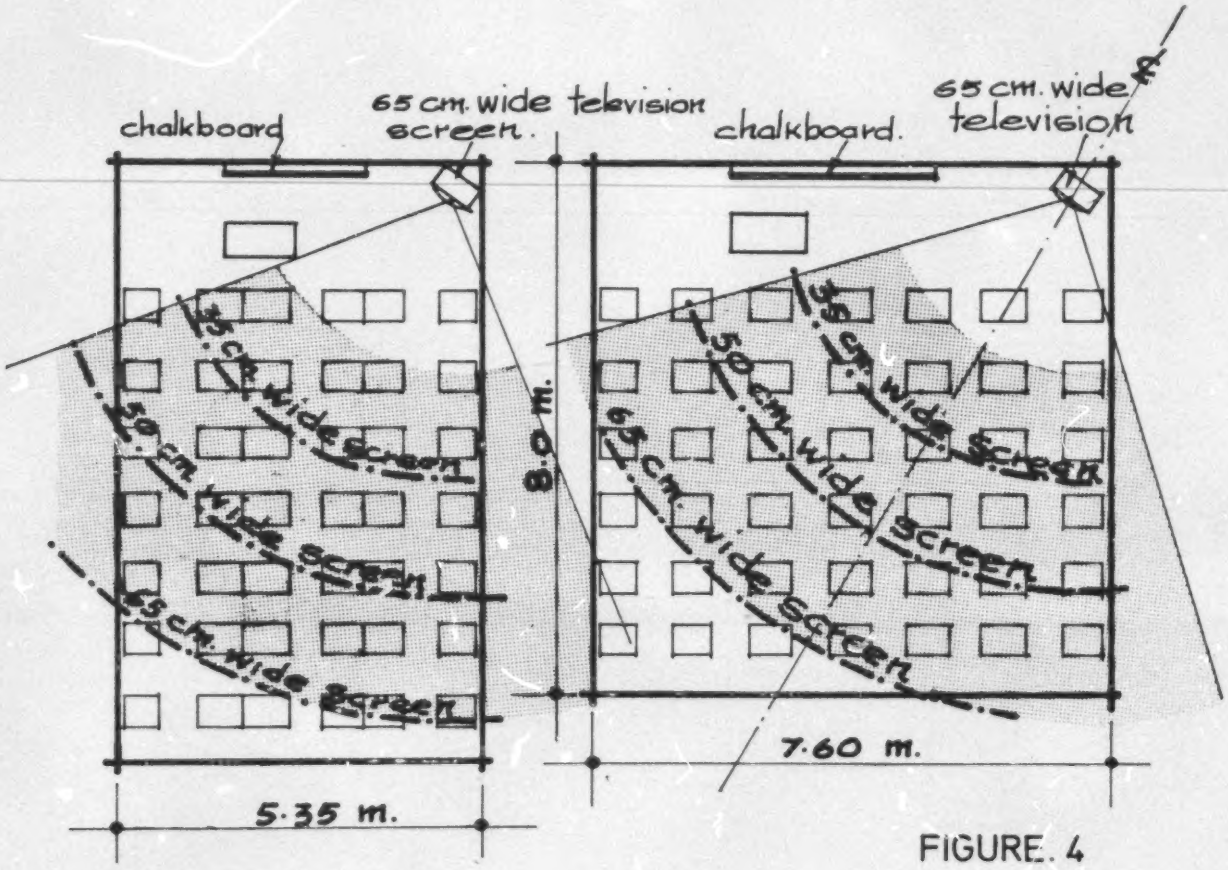


FIGURE. 4

class of 42 children (secondary)

class of children 42 children (secondary)

those outside comfortable viewing area can move over their desks across to within the area assuming full attendance.

Note: Full advantage of classroom can only be taken if a 65cm wide screen is used. Smaller screens result in reduced maximum viewing distance and thus can only be used by teaching groups of:

For 35cm wide screen – about 14
For 50cm wide screen – about 28

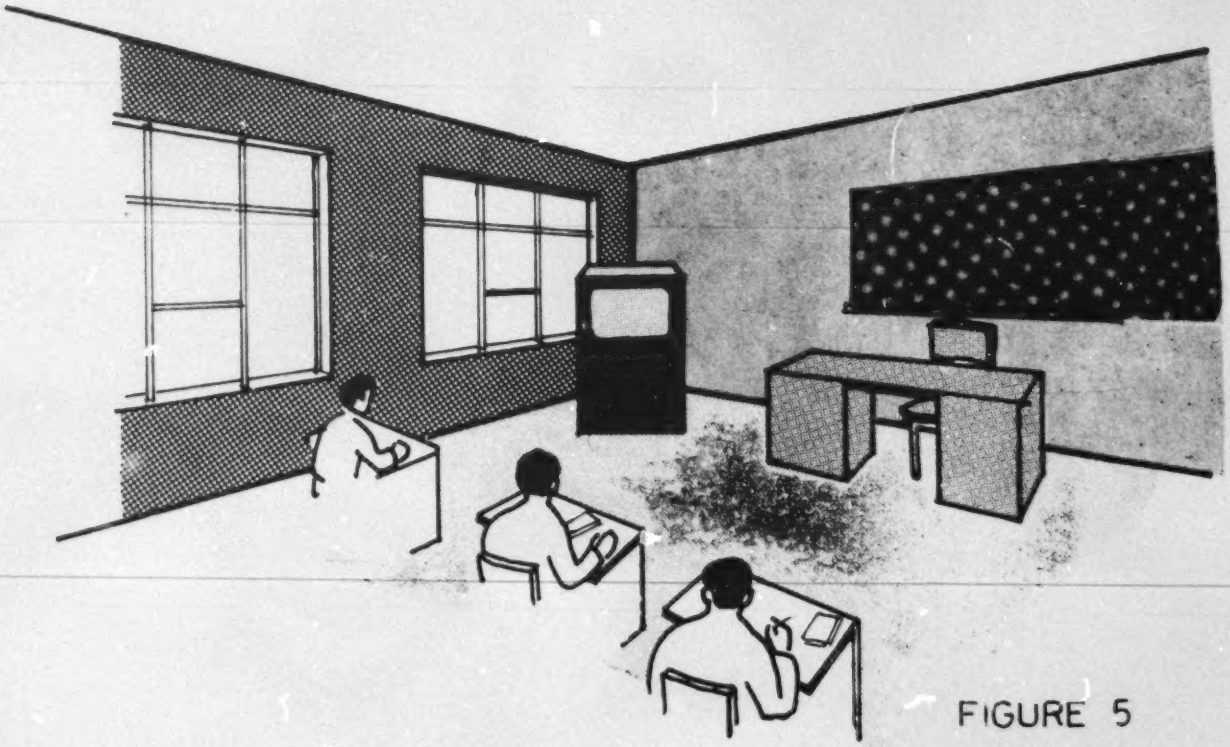


FIGURE 5

(a) by arranging windows as far away from crosswalls as is commensurate with illumination of the chalkboards;

(b) by arranging the screen on a movable trolley and using it on the side of the room having no windows. This poses a door location problem – see Figure 6.

The advantage of the trolley is that the set can be moved from its position near the door after use. It can also, of course, be moved to other rooms. It is important to arrange power outlets for either of the solutions suggested above. Teachers should be able, through conveniently placed outlets, to locate the set at several alternative positions in each room. For example, if the class comprises a small group of 15 children, the screen could be located in front of the chalkboard.

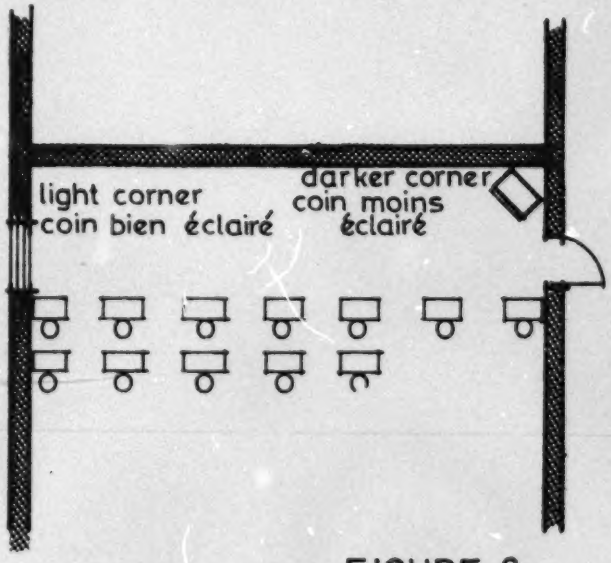


FIGURE 6

Illumination

Where there is no need to darken the room for viewing, adequate illumination for note taking will be provided by daylight through the windows. In situations where it is necessary to pull curtains across windows or otherwise darken the room some supplementary artificial lighting will be needed. This should be directional in character as is shown in Figure 7 and should be arranged so that it does not fall on the television screen.

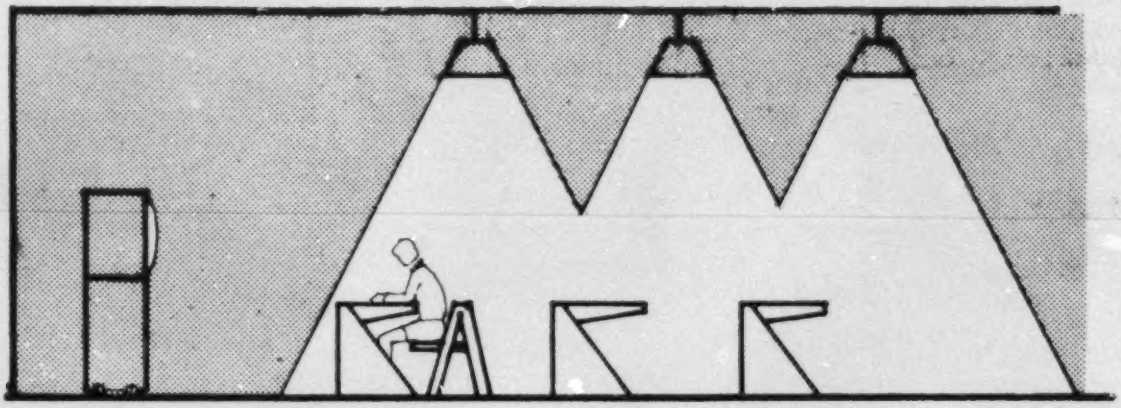


FIGURE 7

Acoustics.

The acceptable background sound level of about 35db A in classrooms should be maintained by the usual techniques of locating these elements of accommodation well away from roads with traffic. Thirty metres is a minimum in hot dry areas where windows are normally closed, 50m in humid areas where windows are usually wide open. On the site itself noise sources such as workshops and music rooms should be kept at a maximum distance from classrooms with television.

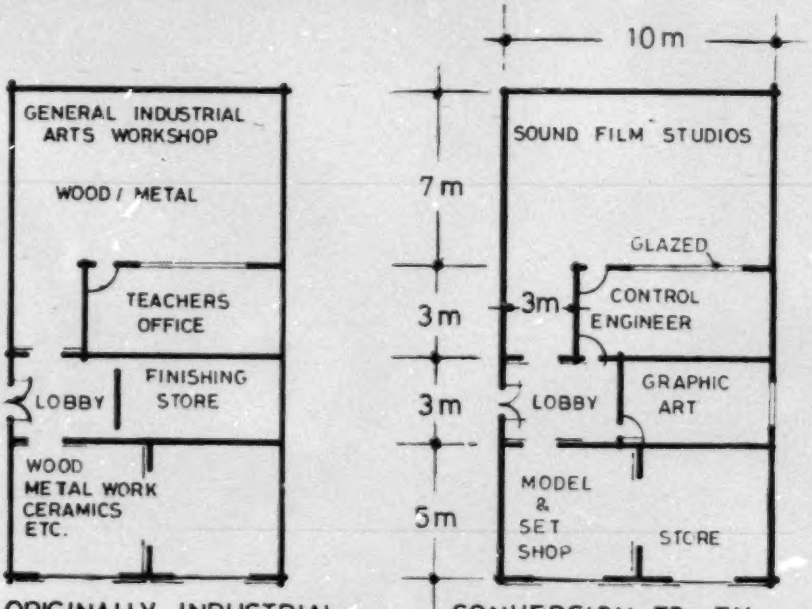
In two-session schools, the children of the second session waiting for the first session to finish can be a noise source and they should be provided with a waiting area as far away from the main building as possible.

Although most of these points are relevant to school design with or without television, they are perhaps worth mentioning again in this context.

School Television Broadcasting facilities.

Although Japan has broadcasting studios in many of its schools for either closed circuit television within the school or for broadcasting to a group of nearby schools through co-axial cable, few other countries are likely to be able to afford such facilities in the near future.

In new schools however, the possibility of the eventual installation of such facilities should be considered and space (which temporarily may be used for other purposes) included in the building. Figure 8 indicates in outline the space requirements for these facilities.



ORIGINALLY INDUSTRIAL ARTS CENTRE

CONVERSION TO TV PRODUCTION UNIT

FIGURE 8

Prepared by D. J. Vickery

Kularatne & Co. Ltd., Colombo 10. 1826-7-70.

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